Alg. 2 Warm Up #6-5

Solve:

1) $2^x = 8$ 2) $3^{x+2} = 27$ 3) $\frac{x-4}{6} = \frac{x+2}{8}$

Try: $2^{4x} = 8^{x+1}$

Preview

HW Questions:

2-4. Jamilla was moving to a new city. She researched the rates charged by the local utility company for water. She found the listing of charges below. She expects that her family may use up to 1,000 cubic feet of water each month.

- $12.70 monthly service fee

Rates
- First 300 cubic feet of water used: $3.90 per 100 cubic feet, or fraction thereof
- After the first 300 cubic feet: $5.20 per 100 cubic feet, or fraction thereof

Let x = water use (ft^3)
y = cost in $

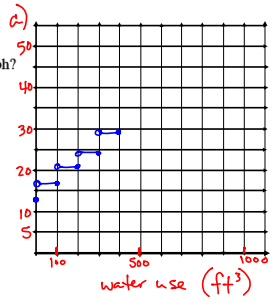
a. Sketch a graph of the cost of Jamilla's possible water usage in one month. Be sure to consider what the cost would be for partial units such as 220 or 675 cubic feet of water.

b. Is this graph a function? Why or why not? yes

c. What are the domain and range of this graph?

x	0	←100	←200	←300
y	12.70	12.70	16.60	20.50
		+3.90	+3.90	+3.90
		16.60	20.50	24.40

←400	←500	...
24.40		
+ 5.20		
29.60		



c) domain (expected)
$0 \le x \le 1000$
range: y = 12.70, 16.60, 20.50, 24.40, 29.60 ...
list them!

2-5. For each equation in parts (a) through (d) below, find the input value that gives the *smallest* possible output. In other words, find the x-value of the *lowest* point on the graph. Then find the input value that gives the *largest* possible output (or the x-value of the *highest* point on the graph).

a. $y = (x-2)^2$ b. $y = x^2 + 2$ c. $y = (x+3)^2$ d. $y = -x^2 + 5$

e. Where on the graphs of each of the above equations would you find the points with the smallest or largest y-values? Vertex

2-6. Sketch $y = x^2$, $y = -3x^2$, and $y = -0.25x^2$ on the same set of axes. What does a negative coefficient do to the graph?

reflection over the x-axis

2-7. Your results from this problem will be useful in the parabola investigation that you will do in Lesson 2.1.2.

a. Draw the graph of $y = (x-3)^2$. If you are drawing the graph by hand be sure to use the domain $0 \le x \le 6$.

b. How is this graph different from the graph of $y = x^2$?

Rt. 3

2-8. Consider the sequence with the initial value 256, followed by 64, 16, ...

a. Write the next three terms of this sequence, then find an equation for the sequence.

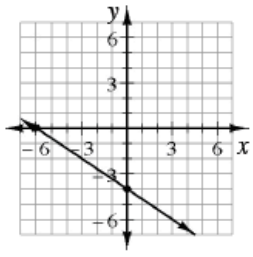
b. If you were to keep writing out more and more terms of the sequence, what would happen to the terms?

c. Sketch a graph of the sequence. What happens to the points as you go farther to the right?

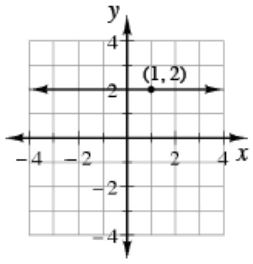
d. What is the domain of the sequence? What is the domain of the function with the same equation as this sequence?

2-9. Write the equation for each graph.

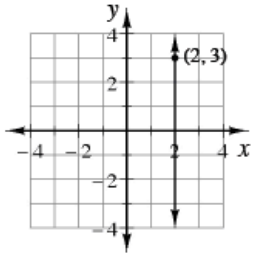
a.



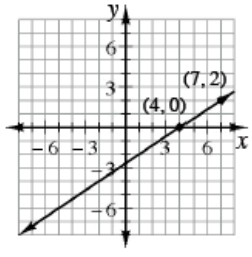
b.



c.



d.



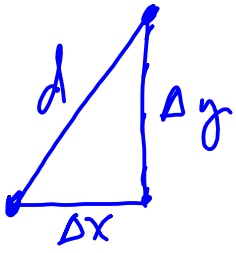
2-10. The slope of $\overline{AB}$ is 5, with points $A(-3,-1)$ and $B(2, n)$. Find the value of n and the distance between points A and B.

$5 = \frac{n+1}{2+3}$

$5 = \frac{n+1}{5}$

$25 = n + 1$

$\boxed{24 = n}$



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = \sqrt{(-3-2)^2 + (-1-24)^2}$

$d = \sqrt{25 + 625}$

$d = \sqrt{650}$

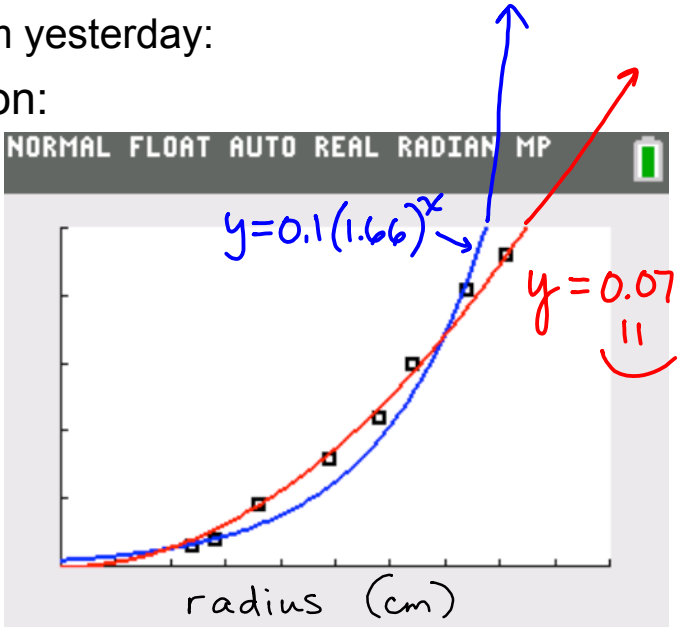
$d = \sqrt{25}\sqrt{26}$

$d = 5\sqrt{26}$

$d \approx 25.5$

CP's from yesterday:

Equation:



parent

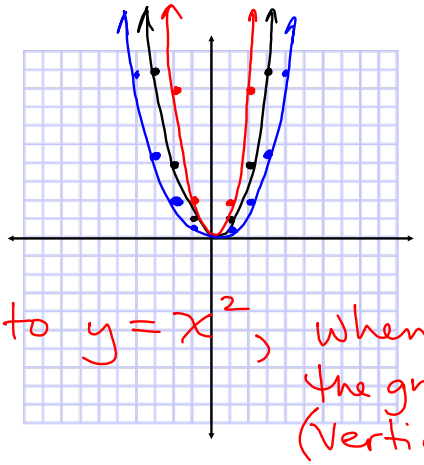
$y = x^2$

$y = 2x^2$

$y = \frac{1}{2}x^2$

$y = ax^2$

affects the width of the graph.



Compared to $y = x^2$, when $a > 1$ the graph narrows. (Vertical stretch)

Vertical compression → when $0 < a < 1$ it gets wider

Week 6 Classwork:

Warm Up on top

Green WS, 2 - #1--->2

CP's: 2 - #11 (On your own piece of graph paper)

2.1.2 How can I shift a parabola? p.60

Parabola Investigation

In Algebra 1 you learned about slope and y-intercept, ideas that allow you to write equations and sketch graphs of any line. During this lesson you will work on developing similar tools for parabolas.

2-11. PARABOLA LAB, Part One

What happens to a parabola's graph when you change the numbers in the equation? To get a better sense of the different ways to transform the graph of a parabola, as a team complete the investigation outlined below. As you work, be sure to sketch the graphs you see in your graphing calculator carefully and record the equations you enter.

a. On graph paper, graph the equation $y = (x-2)(x-2)$. Be sure to label any important points on your graph, including the lowest point on the graph, called the **vertex**. (If the graph were to open downward, the vertex would be the highest point on the graph.) Also sketch and write the equation of the line of symmetry of your graph.

b. Use your graphing calculator to find the equations of two parabolas with *different* graphs that also open upward and still have a vertex at $(2, 0)$. Add sketches of these two new graphs to your graph from part (a), along with their equations. As you work, keep track of any ideas you try along with their results, even if they do not answer this question, as they may help you later.

c. Use your graphing calculator to find the equations of two different parabolas that open *downward*, each with its vertex on the x-axis at $x = 2$. How did you change the equation so that the parabola would open downward? Add sketches of these graphs and their equations to your axes. What are their lines of symmetry?

d. Use your graphing calculator to find the equation of a parabola that opens downward with a vertex at $(-4, 0)$. What is the equation of your parabola's line of symmetry?

e. Choose a new point on the x-axis and find at least three equations of parabolas that touch the x-axis only at that one point.

HW: 2-

#17 ---> 22